

out that whatever the estimated value of sewage may be—8s. 4d. per annum per head of the inhabitants of water-closet towns, or 1½d. per ton with a dilution of 61 tons—it is actually reduced to the sewage farmer by attendant drawbacks to the present mode of application to much less than ¼d. per ton. The sewage must be applied to the land whether it is wanted or not, and may, under such circumstances, be the cause of mischief to crops rather than of benefit. It has been assumed that by surface irrigation one acre is capable of purifying the sewage of 100 persons; but what farmer, Mr. Bailey-Denton very pertinently remarks, would give even a farthing per ton for the obligation to apply in a year 6100 tons of liquid to an acre—equivalent to a superincumbent depth of 5 feet, or 2½ times the average rainfall—though he would gladly give a larger price per ton if he could have what he wanted, just at such times as he wanted it? “All experiences tend to prove that the obligation to ‘get rid’ of a large quantity of sewage under all circumstances and conditions, at night as well as day, on Sundays as well as week-days, on cropped lands as well as fallows, and at all stages of growth, from seed-time to harvest, puts it beyond the reach of man to gain any real profit from it.” Many of the ordinary farm crops, as cereals, pulses, potatoes, and turnips, are injured by the application of sewage. Rye-grass, cabbages, mangolds, carrots, parsnips, and perhaps onions, are the plants that thrive best under sewage (it is said to be impossible to overdose rye-grass with sewage); but these are crops that may very readily be produced in larger quantities than there are markets for.

The great drawback, alluded to above, can be overcome by every sewage farm having specially prepared filtration areas, capable of purifying the whole sewage, when not wanted on the general surface of the farm, and leaving it within the power of the occupier to draw such quantities, at such times as he requires them, as dressings for his crops. Under such arrangements sewage farming may be expected—as it has been found by Mr. Bailey-Denton at Malvern and elsewhere—to be remunerative to the farmer and satisfactory to the town authorities. The cost of laying out the land for intermittent filtration is high—from 30l. to 150l. per acre in difficult cases, according to Mr. Bailey-Denton’s estimate—but not sufficiently high in any way to counteract the immense advantages which the possession of such filtration areas confers.

A MEDICAL INDEX-CATALOGUE

Index-Catalogue of the Library of the Surgeon-General’s Office, U.S. Army. Vol. VII. Insignarès-Leghorn, pp. [100] and 959. (Washington: Government Printing Offices, 1886.)

THE masterly way in which Mr. J. S. Billings is conducting this Index-Catalogue, and publishing punctually year by year these large volumes of about a thousand closely-packed pages, is a matter worth the attention not only of all interested in medicine and surgery, but also of all interested in modern libraries and modern journalistic literature. For the Library of the Office of General Robert Murray, Surgeon-General of the U.S. Army, though only founded in 1830, is now one of the largest collections of medical literature in the world,

larger possibly than that of the British Museum, of the Bibliothèque Nationale of Paris, or the collections of Berlin or Vienna, and it contains some manuscripts, notably a letter of Edward Jenner’s, which the English librarians would be glad to have. Its catalogue is certainly much more complete, as far as it has been published, in spite of the method of execution having been much more difficult. For these seven volumes that have been hitherto published contain more than 254,000 references to articles or essays in journals and periodicals of all kinds and in all languages, arranged under the subjects to which they refer. The French and German pleasure in framing appended bibliographies on the subjects of some monographs which they publish has never given them courage enough to face such a Herculean task. The number of periodicals which either have been or are being taken in by the Library has risen since last year, when vol. vi. was published, from 3005 to 3270, and extends through a wide geographical range, from the *Norsk Magazin* of Christiania, to the *Klin-le I-letzu* (the *Modern Medical News*) of Yedo; and in wide range of interest from the *Revue des deux Mondes*, to the *Dental Luminary* of Macon, Ga., U.S. The learned compilers of the Index-Catalogue are good enough always to translate the Japanese titles when they print them in English letters; indeed they sometimes go further, and, avoiding the difficulty of even transliterating them, give us merely the title in English, with a warning note that the original title is Japanese. Magyar is also as a rule, though not by any means always, translated; Polish sometimes, Russian only occasionally. The whole method of the book is so perfectly orderly and symmetrical, that it makes us wonder whether this want of rule in translation is one of the trifling points in which the individualism of Mr. Billings’ assistants has crept in; for we cannot see that the translated titles are in any way more difficult than the untranslated.

Under the subject-headings come the great masses of quotation of the titles of articles in periodical literature which make the Catalogue so unique. If we turn to the name of an author who writes both books and papers in journals, &c., we shall not find entered under it anything but his separately published works; though, probably, all of those down to his smallest reprint from some Society’s *Transactions*, and with these, in smaller type, a reference to other books to which he has contributed or which he has translated; and, if he is dead, a reference, probably, to some biography of him, and some portrait; but, beyond this, none of his contributions to journals or *Transactions*. Nevertheless, under the subject-title of any such contribution, whether it be Jaundice, Jealousy, or Jequirity, will be found a reference to his article if it was signed, and his name, in bold type, clearly standing out among the mass of contributors to that branch of knowledge. It would have been possible, of course, to print such references twice over—once under the heading of the author, and again under the subject-title; but we can hardly wonder that that has not been done, as it would have added some five or six thousand pages to a series of volumes already in danger of being overweighted, and, also, it would have supplied information which is of more importance to the biographer than to medical science.

Of the subject-titles in this volume, the largest is Labor, under which, in 150 pages, a very complete library is catalogued of some 1500 books and 10,000 articles, well arranged under many headings. Under Kidney, the student will probably be content to find references to about 400 books and 2500 articles.

It is easy to show the vast extent of the work attempted and executed; that there are absolutely no inaccuracies in the result is hardly possible, difficult as it may be to find them. The references in this volume certainly stand many tests, and most of those who have made frequent use of the previous six volumes in practical work have acquired a confidence in their accuracy which is very rare in dealing with such an immense mass of varied languages and types and abbreviations so thickly interspersed with figures.

Both the Library and the Index-Catalogue are brought fully up to date. The volume is presented to the Surgeon-General of the U.S. Army in a letter of preface dated June 1, 1886, and it contains the books and periodical references practically complete up to the end of 1885. If any comparatively modern subject is examined, *e.g.* kairine, we find nothing said or known of it before 1882, and yet 120 references, taking us over all the published literature of the subject, down to the end of 1885.

This seventh volume includes the entries from Insignarès to Leghorn. It is likely to be the middle volume of this encyclopædic work; and certainly if Mr. Billings is able to publish his last and concluding volume in 1892 no one who has any interest in the progress of knowledge will hesitate to congratulate him and his colleagues even more heartily, if it be possible, than at present.

A. T. MYERS

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Sounding a Crater, Fusion-Points, Pyrometers, and Seismometers

THE account given by Prof. John Milne of his ascents and attempts at sounding the crater of Asama Yama is exceedingly interesting, and I can thoroughly sympathise with him in the difficulties he encountered, having been exposed to them on many occasions, and not always coming off so victoriously. He and Mr. Dun, however, have been forestalled by the late Robert Mallet. When I came to Naples some eight years since, I found in one of the store-rooms of the geological department of the Naples University a quantity of apparatus which I soon made out the use of.

It appears that Mallet had this apparatus made especially for the purpose of measuring the temperature and studying the gases and the lava itself within the mouth of the volcano Vesuvius. On his arrival in Naples the state of the mountain did not permit of the experiments being carried on, and the whole of the materials were left in charge of Prof. Guiscardi, who could give no other information than the above. By carefully studying the apparatus I was soon able to understand Mallet's intentions and the mechanism he intended to employ. There are two drums of small wire cable—one for traversing the crater to hold a pulley over the "bocca," and the other for letting down the weight and crucible. The crucible is of cast iron with a bayonet-jointed cover, and is, no doubt, intended to contain substances of

different fusibilities. The apparatus is, however, an improvement on that used in Japan, in that the sounding-rope is insulated and there is an electrical bell and battery so arranged that when the crucible enters the lava it makes an earth-contact and rings the bell. There are other pieces of apparatus that I could not get at, but I think they are intended for chemical researches.

From these facts it will be seen that Prof. J. Milne has been forestalled as far as the method is concerned, but no experiments were ever carried out, either by Mallet on account of failing health, or by those in whose hands the apparatus fell. I made application to be allowed to use the apparatus, but for various reasons was unable to.

Before leaving this subject, may I appeal to your readers for a list of substances the fusion-point of which is known, and all of which would be above a dull red heat? I should like to have as complete a series as possible, so as to obtain results confined within narrow limits. Also any suggestions as to the best form of pyrometer that might be forced into and held in a stream of flowing lava, and that would not be injured by the breaking off of the rocky crust on its removal.

May I be permitted to make a few observations on the question lately raised about the authorship of certain seismographs? Not long since I described in your pages certain instruments that I considered as likely to be useful in such violent earthquakes as shake Ischia from time to time. With the exception of two, no claim was made to originality of principle, and yet I received through your pages a severe scolding from Prof. Ewing. Now if we really go into the literature of the subject we shall find the horizontal pendulum is not the invention of Prof. Ewing, but his present form of seismograph is one of the best applications of such a contrivance for measuring the horizontal component of an earth-wave, and I think he is justified in calling it *his seismograph* in so far as the present model goes. If we did not allow so much, no man using a vertical pendulum, however well contrived and modified, could call such *his*. At any rate I shall leave Prof. Milne, Prof. Ewing, and Mr. Gray to fight their own battle, but Prof. Ewing has fallen into the very same error of which he not long since accused me.

Naples, December 20

H. J. JOHNSTON-LAVIS

The Recent Earthquakes

MAY I ask to be allowed to call attention to some points in relation to the two earthquakes mentioned in your issues of December 9, p. 127 ("Volcanic Eruption in Niua-Fu, Friendly Islands"), and December 16, p. 157 ("Earthquake at Sea"). As regards the first, it is stated that "The whole island has been in a disturbed state for some three months and a half, the dates of the principal disturbances coinciding remarkably with those which are going on in other parts of the world—earthquakes on June 8 and 11, which, I think, are the dates of the first New Zealand outbreaks. . . . This is, of course, not wonderful; but the final catastrophe here took place on August 31, which, we understand, was the exact date of the recent American earthquake. It was preceded for twenty-four hours by earthquakes, and went on for ten days."

Assuming the synchronism of the Tonga eruption and earthquakes with those of the North Island of New Zealand, there is this very interesting relation between the two localities, that they both lie very near to a great circle which I may designate as the "West Coast of Africa Great Circle." This passes through, or near, the following points:—

Cape of Good Hope to St. Helena Bay; mouth of River Orange; Walfish Bay; Cape Martha; Cape Lopez Gonzalez; Bonny River; Algerian coast, near Nemours; south-east coast of Spain, near Almazora; north coast of Spain (3° 25' W. long.); west coast of Ireland (Loop Head); southern point of Iceland (near Westmanna Island); north-west point of Iceland; Greenland, Cape York; Melville Island (south coast and point of); Bering Island; Cape Dalhousie and coast-line of Liverpool Bay; Ala-ka, Montagu Island; Tonga Island (half a degree to west of Tonga Tabu); New Zealand, north-east point of North Island; passes between Adelie Land and South Victoria Land; Enderby's Land. It may be remarked that several of these localities are noted for disturbances both volcanic and seismic.

As regards the "earthquake at sea" mentioned in your number of the 16th inst., the position where it was felt is given as N. lat. 19° 21', and W. long. 64° 22'; this gives a point about 93 miles north-east of Porto Rico. The interest in this